COMPUTER GRAPHICS MINI PROJECT – SIMULATE CELLULAR AUTOMATA THROUGH CONWAYS GAME OF LIFE

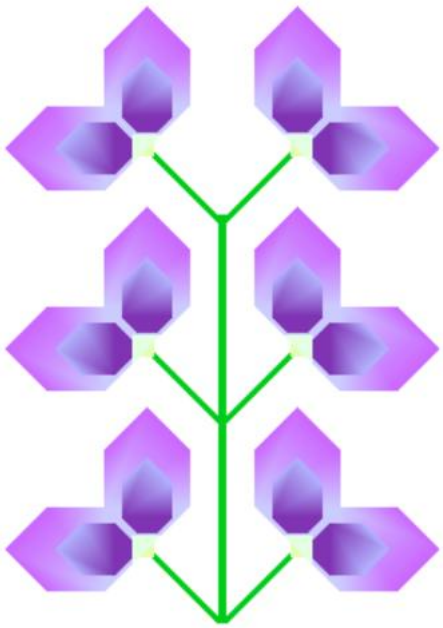
The bold text are project file names. The c files within each contains the relevant code.

You can download the entire project folder and run on Code Blocks, or copy the main.cpp file within each folder to a new Code Block OpenGL project.

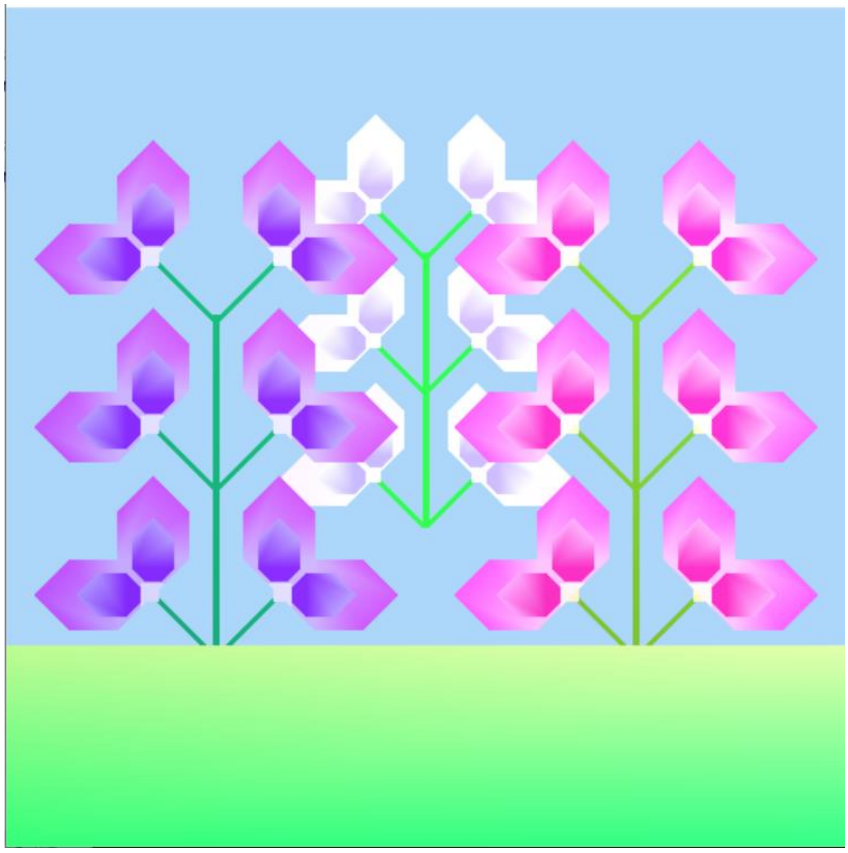
List of files in repository:

1. plant – drawing of 1 plant
2. plant3d – drawing 3 plants with lighting effects
3. game-of_life -basic algorithm implementation, press 'n' to see next iteration
4. game-of_life2 – added animation, color
5. game-of_life3 – added color based on age groups
6. game-of_life4 – added 5 color scheme, inc old age, fixed pause

Plant file contains code to draw 1 plant

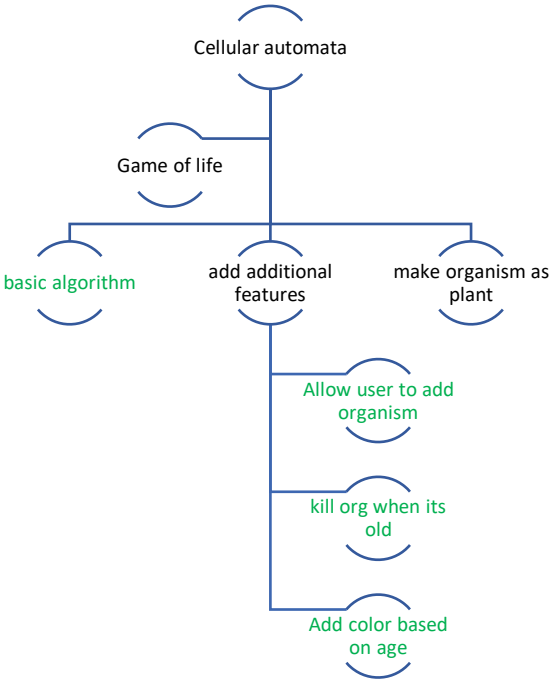


Plant3d is an attempt to draw a garden scene



Problem in getting the grass to reach the plant in z axis

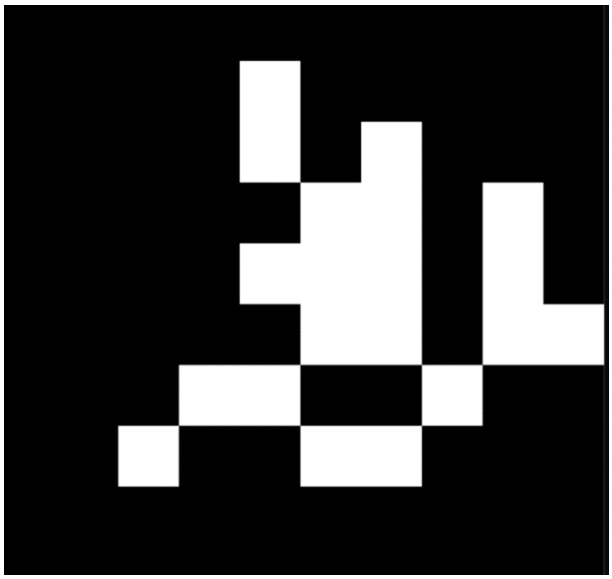
GOAL:



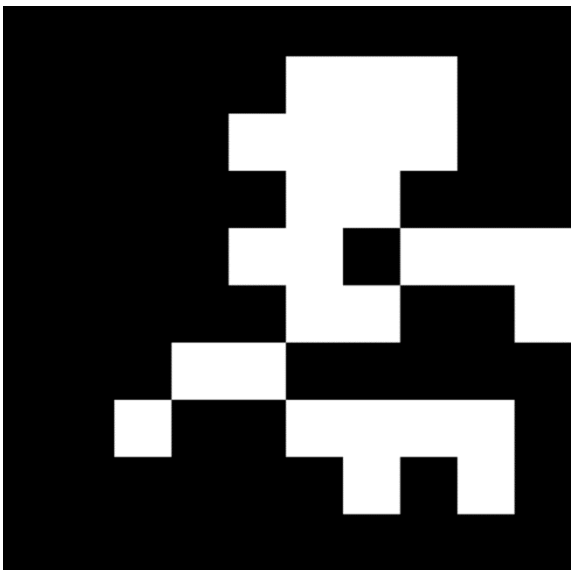
Green = feature added

game-of_life file contains the basic idea of the algorithm to be implemented. It goes to the next step when ‘n’ is pressed

One iteration



Another iteration



This algorithm was written by me, with some reference from:

- https://kylewbanks.com/blog/tutorial-opengl-with-golang-part-1-hello-opengl

Limitations:

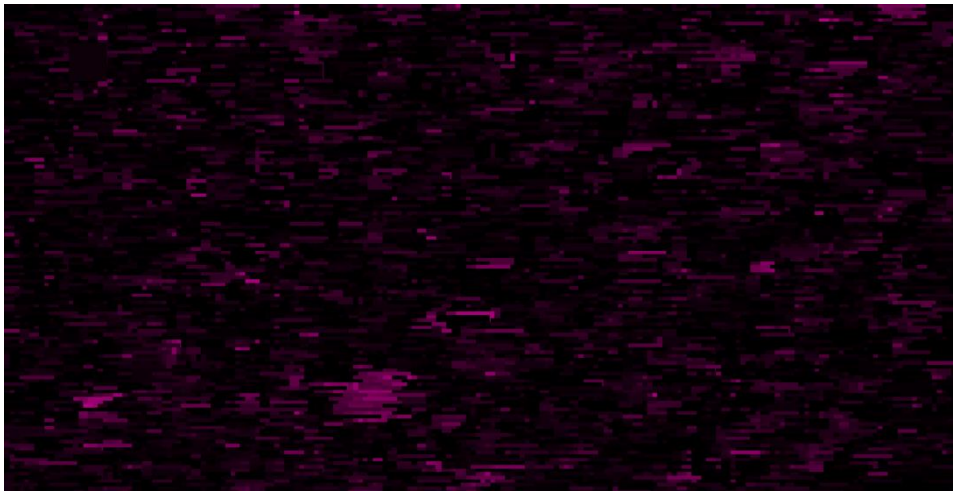
- User has to press ‘n’ everytime to see iteration
- Start state has to be manually coded

game-of_life2 implements colour, user interactivity

Refered for use of timer and interactivity: https://www.youtube.com/watch?v=NPvwGh2ucPk (codelink: https://www.youtube.com/redirect?q=https%3A%2F%2Fdrive.google.com%2Fopen%3Fid%3D0B8GbMg0HqpuZS0FTZzJqN2pKSmM&v=NPvwGh2ucPk&event=video_description&redir_token=bcgRKe7gEAb2nZQjFYyhDN7-nQh8MTU5MDMxODUzOEAxNTkwMjMyMTM4)

- User can add organisms by pressing 2 (pause), using mouse
- Press 1 to view animation
- Press 3 to reset to blank state
- Gives colour to organism based on age (darker=’young’,lighter=’old’) – sometimes difficult to see
- Adds concept of old age
- Problem: When user pauses, all organisms die from old age.

Smaller window size

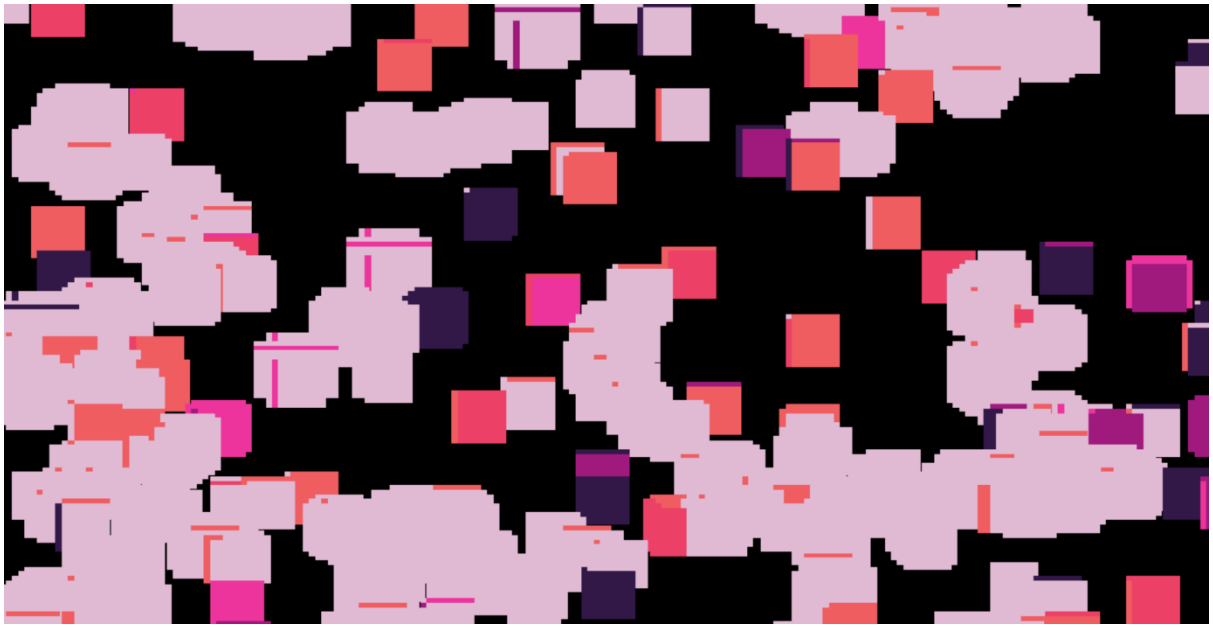


Larger window size

game-of_life3 similar to previous one, but adds colour based on age groups, example 1 color for 0-5, another for 5-10, so on till age 30

- More clearer to view different age groups
- Lower age groups are lighter color, and become darker as they get older
- Can observe formation of colonies
- Fixed the pause problem

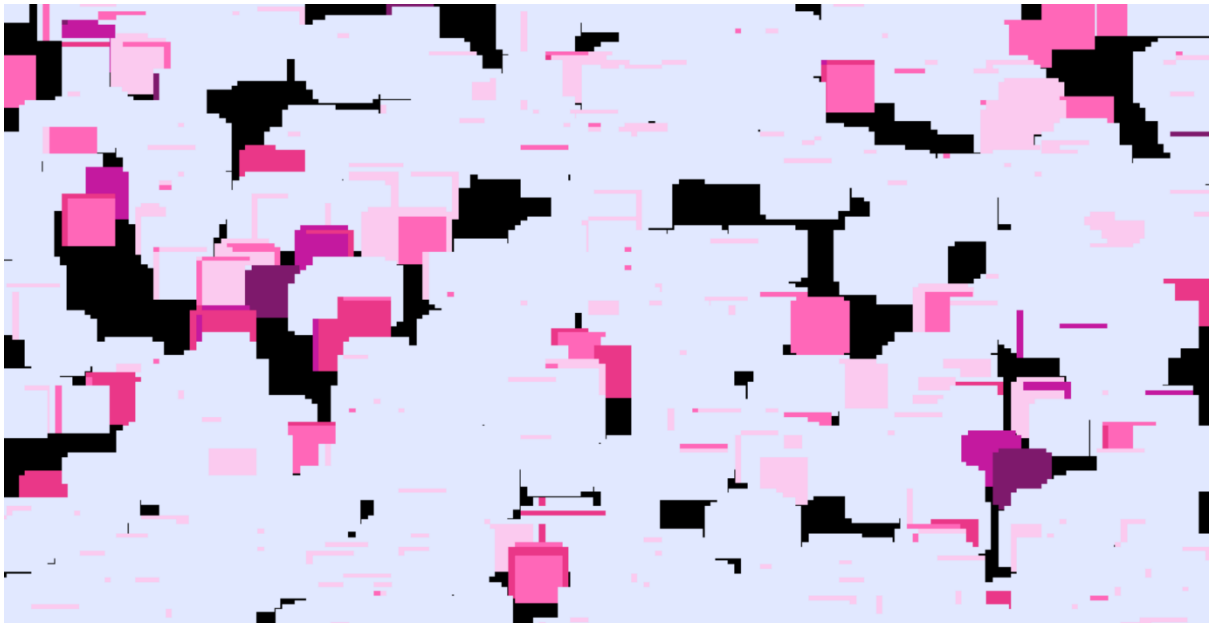
Colour scheme 1



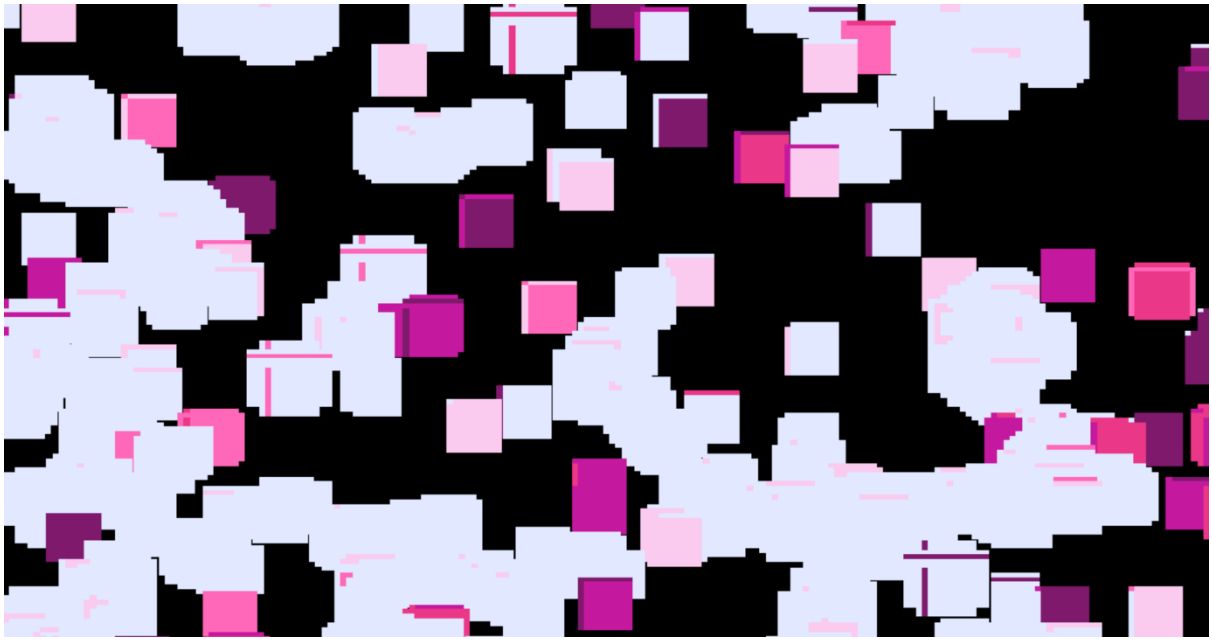
Colony formations based on age group is very clear

Colour scheme 2

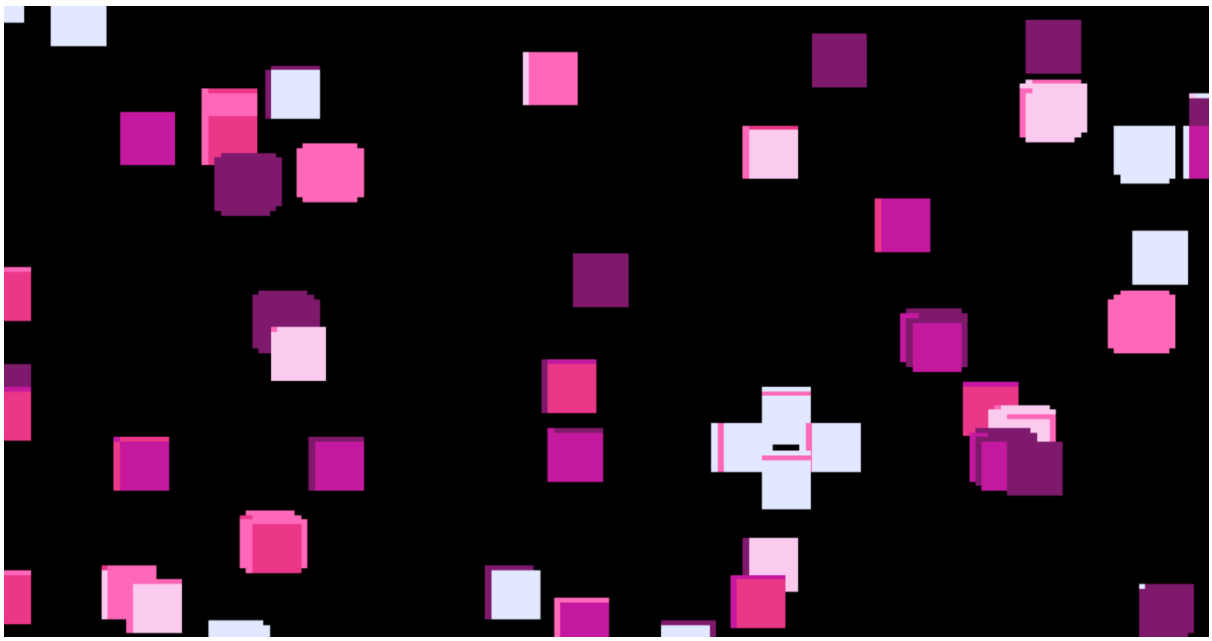
Initial state:



Intermediate state:



Final state:



Color scheme:

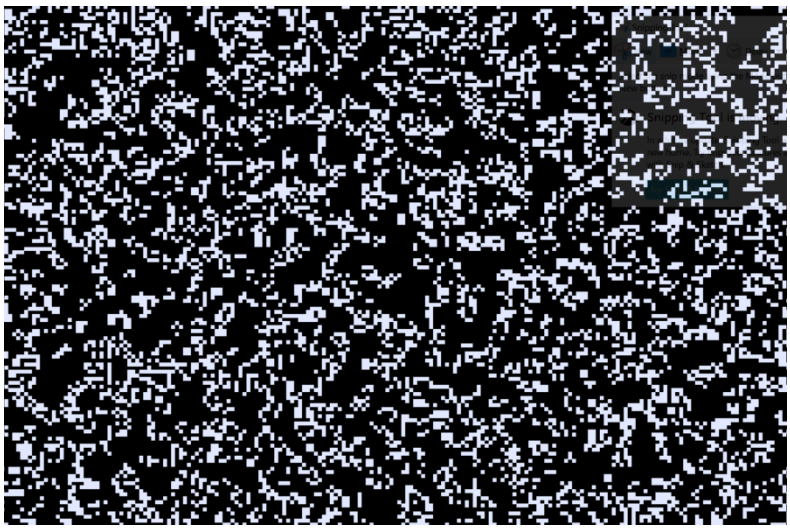
game-of_life_4 : final version, with old age as 50, with additional color, reduced point size

- Old age at 50, additional color
- Point size reduced

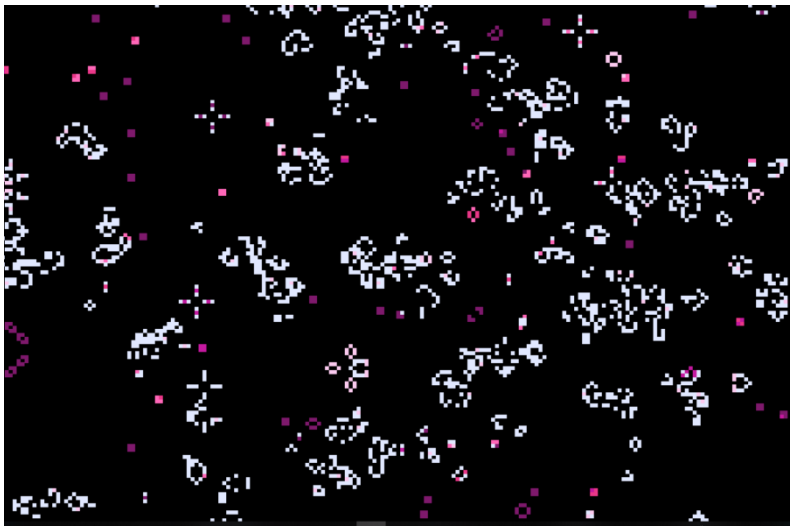
Color scheme used:

E1E8FF	FBCAEF	FF67B8	EA3788	C4199F	7E196C	FFC759
225, 232, 255	251, 202, 239	255, 103, 184	234, 55, 136	196, 25, 159	126, 25, 108	255, 199, 89

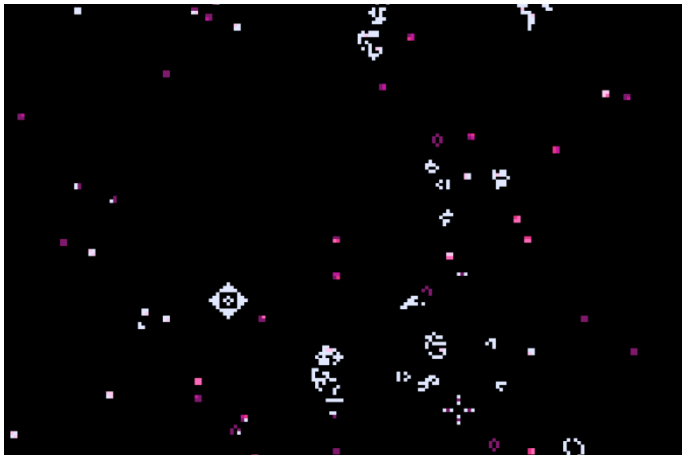
Link for color scheme: https://coolors.co/e1e8ff-fbcaef-ff67b8-ea3788-c4199f-7e196c-ffc759



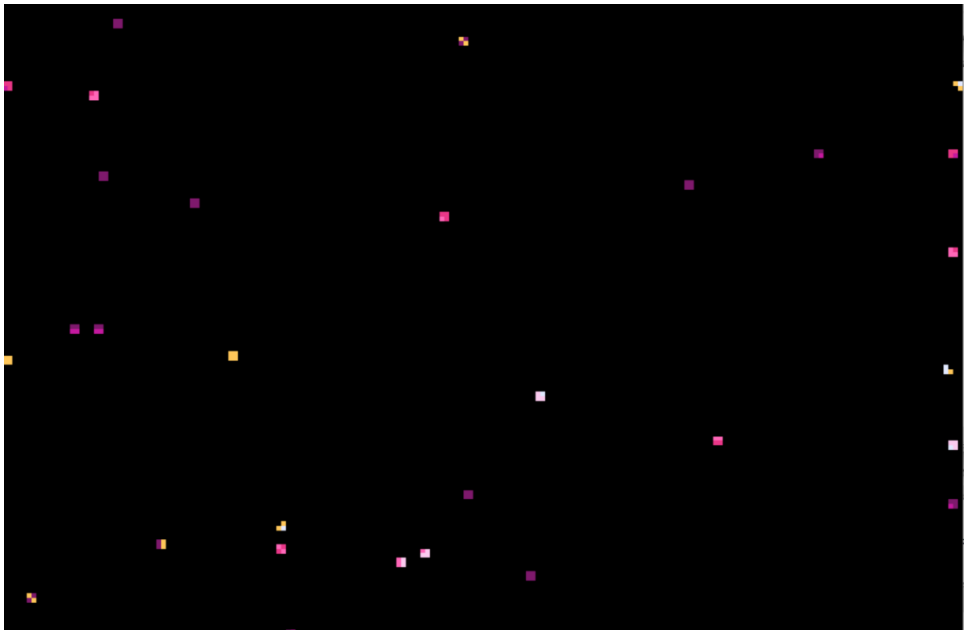
Initial state



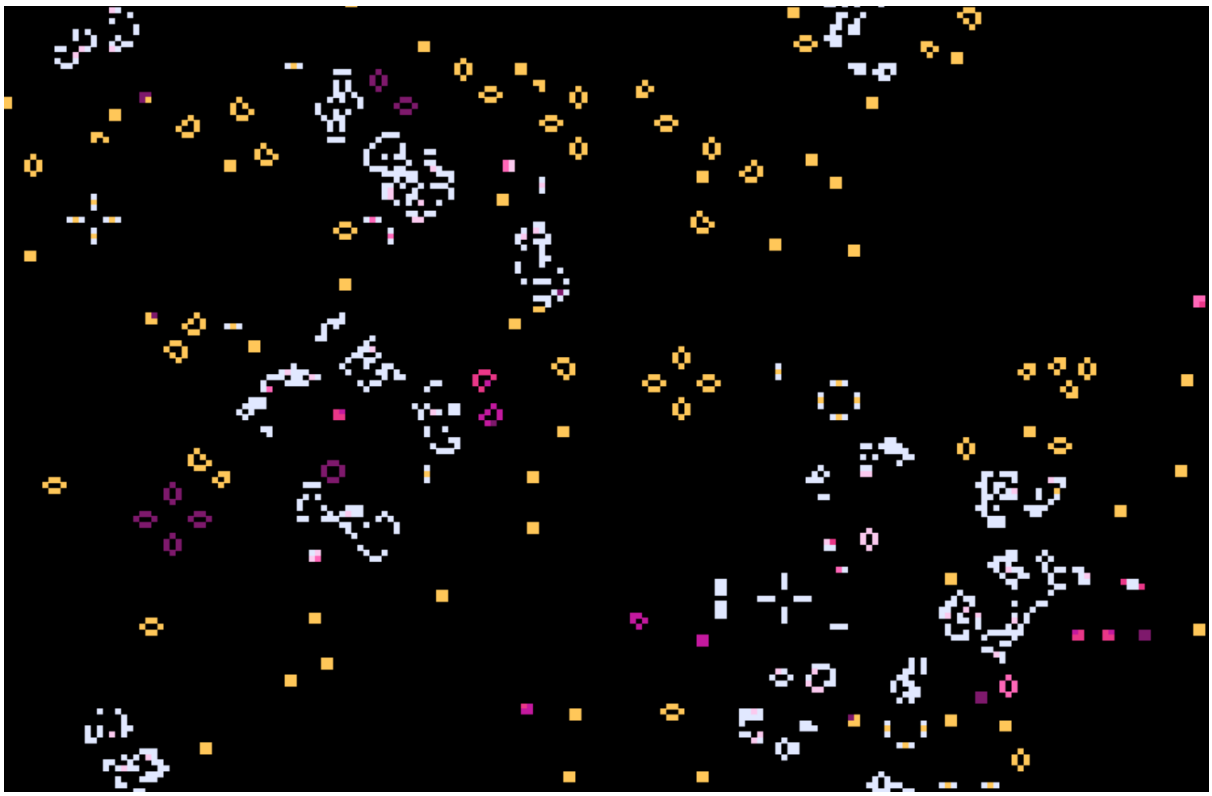
Intermediate state



Near end state



End, society is sustainable, equal births and deaths.



With old age as 300

PROGRAM: Please see the code for final version in folder **game-of_life_4, file main.cpp**

Comments are written, please feel free to ask any doubts/clarifications

PARAMETERS THAT CAN BE MODIFIED:

Age for old age(automatic death) : **old_age**

Animation speed (milli sec): **speed**

Size of point : **point_size**

Summary of features in final version:

- User can pause game by pressing 2
- User can resume game by pressing 1
- User can reset board to empty by pressing 3
- User can add organisms(points) with leftmouse click/drag in **pause mode**
- Color of organism changes with age
- Once old age is reached organism dies